Lighting Provisions

Joseph G. Howley Jr.
GE Lighting
Immediate Past Chair, ASHRAE SSPC 90.1
Lighting Subcommittee

1989 vs. 1999

- Control credits are eliminated
- Control points are no longer used
- Most exterior power requirements replaced with minimum efficacy (lumens/watt) requirements

1989 vs. 1999 (Cont'd)

- **Interior Power requirements updated**
  - **Requirements more stringent**
  - **No more area factor calculations**
  - **No more building size dependencies**

Section 9

- 9.1 General Application
- 9.2 Mandatory Provisions
- 9.3 Prescriptive Path
  - Interior Lighting Power Allowance
    - Building Area Method
    - Space by Space Method
  - Exterior Lighting Power Allowance

Section 9.1 General Application

- Interior spaces of buildings
- Exterior building features
- Exterior grounds lighting powered through the building

Section 9.1 General Application (Cont'd)

- Exceptions
  - Emergency lighting
  - Lighting required by life safety statute
  - Lighting within living units of buildings
  - Decorative gas lighting

Lighting Alterations to Existing Buildings

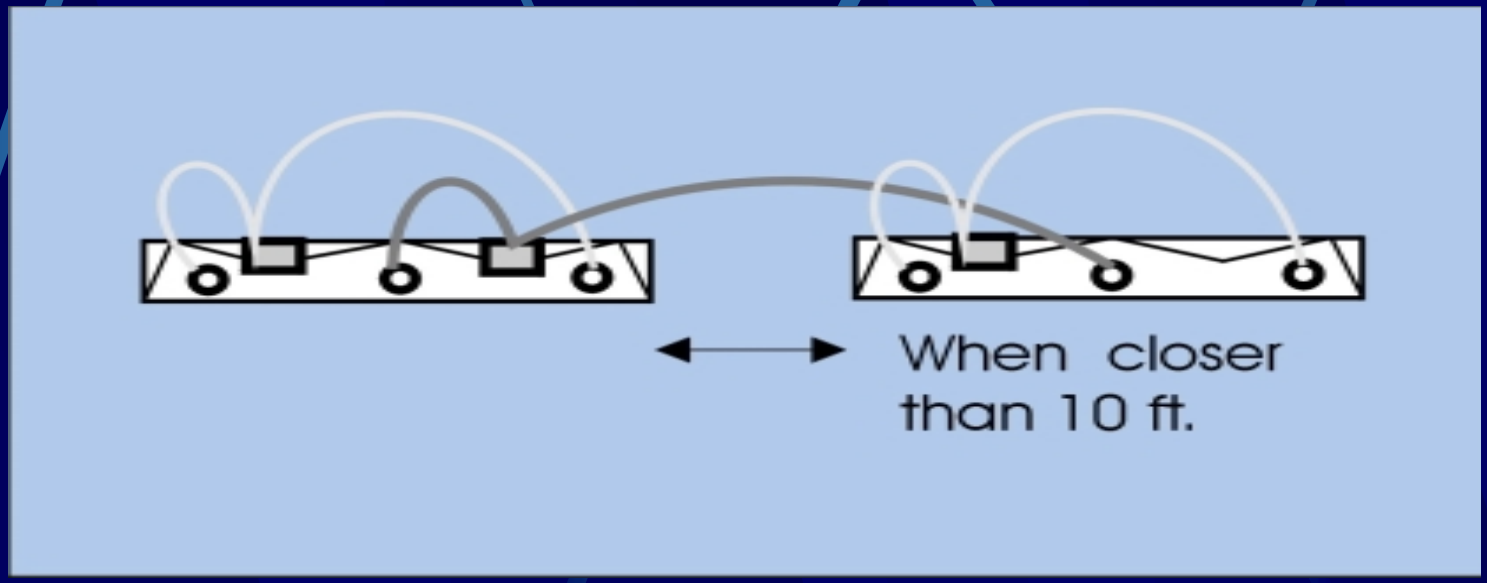
- **Replacement systems - comply with power density and control requirements**
- **Exception: Alterations that replace < 50% of the luminaires in a space**

Section 9.2 Mandatory Provisions
Interior Controls

- Automatic Lighting Shutoff
  - Programmable Whole Building Controller
  - Occupancy Sensors/Other
  - Allow occupant Intervention
- Additional Separate Controls

  Accent, Case, Task, Hotel Room, Non-visual, Demonstration

Section 9.2.2 Tandem Wiring



Tandem Wiring Exceptions

- Separated Surface or pendant luminaires
- Recessed luminaires more than 10 ft apart
- Other luminaires:
  - With three-lamp ballasts
  - On emergency lighting circuits
  - With no available pair
  - With one-lamp, high frequency, electronic ballast

Section 9.2.3 Exit Signs

- Exit signs operating at greater than 20 watts shall have a minimum source efficacy of 35 lumens per watt

Section 9.2.5 Luminaire Wattage

- Standard incandescent = max. labeled wattage of the luminaire
- Luminaires with ballasts = wattage of the lamp/ballast combination
- Line voltage track = min. 30 W per foot
- Low voltage track = transformer wattage
- All others as specified

Lighting Power Development Concept

- Create Building Space Models to calculate power densities with:
  - Current product performance data
  - Updated efficacy and loss factors
  - New building construction data
  - IES recommended light levels
  - Professional lighting design consensus

Building Area Method Lighting Power Densities

- Hospital - 1.6 W/ft^2
- Library - 1.5 W/ft^2
- Manufacturing - 2.2 W/ft^2
- Museum - 1.6 W/ft^2
- Office - 1.3 W/ft^2
- Parking Garage - 0.3 W/ft^2
- Retail - 1.9 W/ft^2
- School - 1.5 W/ft^2

Space by Space Lighting Power Allowance

- **Office Building**
  - **Office Enclosed - 1.5 W/ft^2**
  - **Office Open - 1.3 W/ft^2**
  - **Conference - 1.5 W/ft^2**
  - **Training - 1.6 W/ft^2**
  - **Lobby - 1.8 W/ft^2**
  - **Lounge - 1.4 W/ft^2**
  - **Dining - 1.4 W/ft^2**
  - **Food Prep - 2.2 W/ft^2**
  - **Corridor - 0.7 W/ft^2**
  - **Restroom - 1.0 W/ft^2**
  - **Active Storage - 1.1 W/ft^2**

Section 9.3.1.2.1 Additional Interior Lighting Power

- Decorative - 1.0 W/ft^2 in space used
- Fluorescent designed to eliminate screen glare (IES RP1) - 0.35 W/ft^2
- Accent Lighting in specific space used
  - **Additional 1.6 W/ft^2 , or**
  - **Additional 3.9 W/ft^2 for fine merchandise**

Exterior Controls/Building Grounds Lighting

- Automatic shutoff when sufficient daylight is available
  - Photosensor
  - Time switch
- Building grounds lamps > 100W = efficacy of 60 LPW (unless controlled by a motion sensor)

Section 9.3.2 Exterior Building Lighting Power

- Building Surface Requirements:
  - Building Entrance w/canopy - 3W/ft^2
  - Building Entrance - 33 W/linear ft
  - Building Exit - 20 W/linear ft
  - Building Façades - 0.25 W/ft^2